ASOS 30-SECOND CEILOMETER DATA
TD - 6404

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina

August 1998

This document was prepared by the U.S. Department of Commerce,
National Oceanic and Atmospheric Administration, National
Environmental Satellite, Data and Information Service, National
Climatic Data Center, Asheville, North Carolina.

This document was designed to provide general information on the
current origin, format, integrity and availability of this data
file.

Errors found in this document should be brought to the attention
of the Data Base Administrator, NCDC. See Topic 58 for a summary
of this data set.

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SUMMARIZATION

1. Data Set ID

TD-6404

2. Data Set Name

Automated Surface Observation System (ASOS) 30-Second Ceilometer Data. (Post July 1998)

3. Description: Data Set Aliases

ASOS Ceilometer Data
ASOS High-Resolution Data
ASOS Cloud Height Indicator (CHI) Data

4. Description: Access Method and Sort for Archived Data

Data are archived in a fixed-length file structure on magnetic tape cartridges. Archived data are currently sorted by Station ID (WBAN number) as the primary key and year, month, day, hour, minute, second, and ceilometer ID number as secondary keys.

The ceilometer data is made up of two record types, A time record and a data record. Each minute of ceilometer data is comprised of one time record and two data records. All ceilometer records are a fixed length of 110 characters. The time record consists of an identification portion, the literal string "UTC", and the hour and minute for the following two data records. Each data record consists of the same identification portion and a data portion. The identification portion includes the station number, date/time and ceilometer number. Included in the data portion are the meteorological elements and certain instrument engineering-related data.

NCDC Library Tapes are structured as follows:

```
 Record Length  :  Fixed 110 characters
  Block Length  :  15,400 characters
         Media  :  ASCII, 18-Track IBM-Type 3480 Cartridge
       Density  :  36,000 BPI
        Parity  :  Odd
         Label  :  ANSI Standard Label
          File  :  One file per tape
```

5. Description: Access Method and Sort for Supplied Data

Users receive data in a fixed-length record structure described

below. The data are sorted in the same manner as described in
Topic 4.

Data can be provided on magnetic tape structured as follows:

```
    Record Length  :  Fixed 110 characters
     Block Length  :  15,400 characters
            Media  :  ASCII or EBCDIC Modes - 9 Track / 18 Track
          Density  :  800, 1600, or 6250 BPI (36,000 BPI on IBM-
Type                          3480 Cartridge
           Parity  :  Odd
            Label  :  ANSI Standard labeled (ASCII only) or
                      unlabeled
             File  :  One file per tape
```

TD-6404 data can also be provided on high-density, double sided,
IBM-compatible 5 1/4-inch or 3 1/2-inch diskettes.

Following is information and examples on how to access the fixed-
length records, specifically:

a. COBOL Data Description
b. FORTRAN Data Description
c. List of Variables ("Elements")

The following COBOL and FORTRAN statements are to be used as
guidelines only. NCDC recognizes the fact that many different
types of equipment are used in processing these data and several
programming approaches might be applied to access the data. It
is not possible to cover all possibilities.

a. COBOL Data Description

This is a typical ANSI Standard COBOL Fixed-Length Description.

```
FD      INDATA
        LABEL RECORDS ARE STANDARD
        RECORDING MODE F
        BLOCK CONTAINS 140 RECORDS
        DATA RECORD IS DATA-RECORD.
01      DATA-RECORD.
        02 id_section.
           04 WBAN-NUMBER                PIC 9(5).
           04 ICAO-CALL                  PIC X(4).
           04 FAA-CALL                   PIC x(4).
           04 YEAR                       PIC 9(4).
```

2

```
    04 MONTH                        PIC 99.
    04 DAY                          PIC 99.
    04 HOUR                         PIC 99.
    04 MINUTE                       PIC 99.
    04 SECOND                       PIC 99.
    04 CEILOMETER-NUM               PIC 9.
02 STATION-RECORD                   PIC x(82).
02 UTC-RECORD REDEFINES STATION-RECORD.
    04 UTC-FIELD                    PIC X(3).
    04 FILLER                       PIC XX.
    04 HR-MN                        PIC 9(4).
    04 FILLER                       PIC X(73).
02 CEILING-RECORD REDEFINES UTC-RECORD.
    04 ECHO-IND                     PIC 9.
    04 ALARM-STAT                   PIC XX.
    04 FILLER                       PIC X.
    04 FST-HEIGHT                   PIC X(5).
    04 FILLER                       PIC X.
    04 FST-THICK                    PIC X(5).
    04 FILLER                       PIC X.
    04 SND-HEIGHT                   PIC X(5).
    04 FILLER                       PIC X.
    04 SND-THICK                    PIC X(5).
    04 FILLER                       PIC X.
    04 STATUS-FLGS                  PIC X(10).
    04 FILLER                       PIC X.
    04 GAIN                         PIC 9.
    04 FILLER                       PIC X.
    04 PULSE-FREQ                   PIC 9.
    04 FILLER                       PIC X.
    04 RMS-NOISE                    PIC S9V99 SIGN LEADING
                                              SEPARATE.
    04 FILLER                       PIC X.
    04 SUM                          PIC S9(3) SIGN LEADING
                                             SEPARATE.
    04 FILLER                       PIC X.
    04 IIN-INFO                     PIC S9(3) SIGN LEADING
                                              SEPARATE.
    04 LAS                          PIC 9(3).
    04 FILLER                       PIC X.
    04 INTL-TEMP                    PIC S99V9 SIGN LEADING
                                              SEPARATE.
    04 FILLER                       PIC X.
    04 OFFSET                       PIC 99V99.
    04 XX-INFO                      PIC S99 SIGN LEADING
                                              SEPARATE.
    04 FILLER                       PIC X.
    04 EXTCT-COEFF                  PIC XXX.
```

3

```
        04 FILLER                          PIC XXXX.
```

b. FORTRAN Data Description

(1) FORTRAN 77, Example

```
        IMPLICIT INTEGER (A-Z)

        REAL RMS, INT-TEMP, OFFSET

        CHARACTER*4 ICAO-CALL, FAA-CALL
        CHARACTER*82 DATA

        OPEN(10,FILE='FILENAME',ACCESS='SEQUENTIAL'
     +      STATUS='OLD',FORM='FORMATTED',MRECL=110,
     +      TYPE='ANSI',BLOCK=15400)

   C  The last three arguments in the OPEN statement are
   C  extensions on the UNISYS system.

        READ(10,20,END=999) WBAN, ICAO, FAA, YEAR, MONTH,
     +      DAY, HR,MIN, SEC, CEIL-NUM, DATA

   20   FORMAT(I5,A4,A4,I4,5I2,I1,A82)
```

c. List of Variables

ELEMENT	WIDTH	POSITION
Header (on all records):		
WBAN	5	001-005
ICAO-CALL	4	006-009
FAA-CALL	4	010-013
YEAR	4	014-017
MONTH	2	018-019
DAY	2	020-021
HOUR	2	022-023
MINUTE	2	024-025
SECOND	2	026-027
CEILOMETER #	1	028-028

Since the station data is archived as received with no editing
for transmission errors, the following fields may not always
appear in this format. However, all records have been buffered
to 110 character length.

4

<u>UTC Record:</u>

Field	Length	Position
"UTC "	5	029-033
HOUR	2	034-035
MINUTE	2	036-037
FILLER	73	038-110

<u>DataRecord:</u>

Field	Length	Position
ECHO INDICATOR	1	029-029
ALARM STATUS	2	030-031
FILLER	1	032-032
1ST LAYER HEIGHT	5	033-037
FILLER	1	038-038
1ST LAYER THICKNESS	5	039-043
FILLER	1	044-044
2ND LAYER HEIGHT	5	045-049
FILLER	1	050-050
2ND LAYER THICKNESS	5	051-055
FILLER	1	056-056
STATUS FLAGS	10	057-066
FILLER	2	067-068
GAIN (G)	1	069-069
FILLER	1	070-070
LASER PULSE FREQUENCY (F)	1	071-071
FILLER	1	072-072
NOISE RMS VOLTAGE (N.NN)	4	073-076
FILLER	1	077-077
TOTAL BACKSCATTERED POWER (SUM)	3	078-080
FILLER	1	081-081
INTERNAL PROCESSING INFO (IIN)	3	082-084
FILLER	1	085-085
MEASURED LASER POWER (LAS)	3	086-088
FILLER	1	089-089
INTERNAL TEMPERATURE (TL.X)	4	090-093
FILLER	2	094-095
OFFSET (OF.FS)	4	096-099
FILLER	1	100-100
INTERNAL PROCESSING INFO (XX)	2	101-102
FILLER	1	103-103
EXTINCTION COEFFICIENT, 0 - 500FT (PP)	3	104-106
FILLER	4	107-110

d. Format (Fixed-Length Record Layout)

The ceilometer data is made up of two record types, A time record
and a data record. Each minute of ceilometer data is comprised
of one time record and two data records. All ceilometer data
records are a fixed length of 110 characters. The time record

contains the literal string "UTC" and the hour and minute for the following two data records. Each data record contains the ceilometer data, status flags and sensor data for a thirty-second data sample.

6.   Description: Element Names and Definitions

Information for some of the elements, particularly the ceilometer status indicators, is incomplete. All information provided by the NWS ASOS Technical Division is reproduced here.

General information: Each element is classified as numeric [N] or alphanumeric [A] as indicated after each element name. Values recorded in numeric elements are right-justified with unused positions zero-filled; signed numbers always begin with a "+" or a "-" in the left-most position. Recorded values in alphanumeric elements are left-justified and unused positions are filled with blanks or a constant value when specified.

Missing and unknown values of numeric elements are generally indicated by all spaces or occasionally "[M]".

WBAN [N]

The WBAN (Weather Bureau, Army, Navy) number is a unique five-digit station identification number assigned by NCDC.

ICAO [A]

The ICAO (International Civil Aviation Organization) call sign is a unique four character station identifier assigned by the ICAO.

FAA [A]

The FAA (Federal Aviation Administration) call sign is a unique three or four character station identifier assigned by the U. S. Federal Aviation Administration.

YEAR [N]

The year (LST) of observation.

MONTH [N]

The month (LST) of observation. The range of values is 01 - 12.

DAY [N]

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The day (LST) of observation. The range of values is 01 – 31.

HR [N]

The hour (LST) of observation. The range of values is 00 – 23.

MIN [N]

The minute (LST) of observation. The range of values is 00 – 59.

SEC [N]

The second (LST) of observation. The possible values are:

    " " Indicates UTC time record.
    "00" Indicates first 30 second record for this minute.
    "30" Indicates second 30 second record for this minute.

CEIL ID [N]

The ceilometer ID number. The range of values is 1 – 3. Most stations will have one ceilometer and will be assigned an arbitrary number of 1. At sites with two or three ceilometers, the ID number will correspond to the order of data receipt. The first 30-second record received for a specific time will be assigned a "1", the second a "2" and the third a "3". The ceilometer ID is used to distinguish among up to three records with the same date and time.

ECHO IND [N]

The echo indicator defines the type of signal received by the ceilometer. The range of values is 0 – 4 and 9.

        0 – no echo (clear air)
        1 – one cloud layer detected
        2 – two cloud layers detected
        3 – no visible cloud detected, layers of water vapor
           produce a return signal. The ceilometer data
           estimate a vertical visibility and thickness.
        4 – sky is partially obscured and no cloud base is
           detected.
        9 – missing/unknown

ALARM STATUS [A]

The alarm status indicates if any status flags (field 15) are set. The two character field may be "0b" OR "11", where b is a

blank.

        0b – all alarm status flags are in OK state
        11 – at least one alarm status flag is set

1ST LAYER HEIGHT [A]

The height in feet Above Ground Level (AGL) of the base of the
first cloud layer. The height is derived by statistical analysis
of data acquired by a vertical-sensing laser beam cloud height
indicator during a 12-second period of the previous 30 seconds.

The range of values is 100' to 12,000'and "/////". Missing
(inoperable) is recorded as 99999. Height for clear sky is
recorded as "/////". Precision is to the nearest 100' for cloud
heights between the surface and 5,000' to the nearest 200' for
cloud heights between 5,000' and 10,000' and to the nearest 500'
for cloud heights above 10,000'.

    Note: If the ECHO IND element is recorded as 3, the
           vertical visibility will be recorded in this field
           instead of cloud layer height. The vertical
           visibility is the height at which 50% of the strength
           of the laser beam is lost due to scattering only.

1ST LAYER THKNESS [A]

The thickness in feet of the first cloud layer is represented by
distance into the cloud ("fixed-base" cloud, e.g., cumulus,
stratocumulus, or altocumulus: ECHO IND value 1 or 2) where one-
half of the pulse beam strength is lost due to attenuation,
scattering, and absorption. Thickness for "fixed base" clouds is
recorded in 50-foot increments from 50-500 feet inclusive.

The thickness for "non-fixed-base" clouds (ECHO IND value of 3)
can be any value of 50-foot increments up to nearly 12,000 feet.
It is represented by the distance into the cloud where all of the
pulse beam strength is lost.

Missing (inoperable) is recorded as 99999. Thickness for a clear
sky is recorded as "/////".

2ND LAYER HEIGHT [A]

The height in feet Above Ground Level (AGL) of the base of the
second cloud layer. The height is derived by statistical
analysis of data acquired by a vertical-sensing-laser-beam-cloud-
height indicator during a 12-second period of the previous 30

seconds.

The range of values is 100' to 12,000' and "/////". Missing
(inoperable) is recorded as 99999. When clouds are not present
for the second layer or the sky is clear, this height is recorded
as "/////". Precision is to the nearest 100' for cloud heights
between the surface and 5,000' to the nearest 200' for cloud
heights between 5,000' and 10,000' and to the nearest 500' for
cloud heights above 10,000'.

> Note: If the ECHO IND element is recorded as 3, the
> vertical visibility will be recorded in this field
> instead of cloud layer height. The vertical
> visibility is the height at which 50% of the strength
> of the laser beam is lost due to scattering only.

2ND LAYER THKNESS [A]

The thickness in feet of the second cloud layer is represented by
distance into the cloud ("fixed-base" cloud, e.g., cumulus,
stratocumulus, or altocumulus: ECHO IND value 1 or 2) where one-
half of the pulse beam strength is lost due to attenuation,
scattering, and absorption. Thickness for "fixed base" clouds is
recorded in 50-foot increments from 50-500 feet inclusive.

The thickness for "non-fixed-base" clouds (ECHO IND value of 3)
can be any value of 50-foot increments up to nearly 12,000 feet.
It is represented by the distance into the cloud where all of the
pulse beam strength is lost.

Missing (inoperable) is recorded as 99999. When clouds are not
present for the second layer or the sky is clear, this thickness
is recorded as "/////".

STATUS FLAGS [N]

Ten one-character indicators that define the status of the
ceilometer at the time of the observation. Unless otherwise
indicated, a value of 0 means OK or 'yes' and a value of 1 means
an alarm condition exists or 'no'. Missing/unknown is recorded
as 9.

```
    Position
        1         Hardware alarm
        2         Supply Voltage alarm
        3         Laser Power Low alarm
        4         Temperature alarm
        5         Solar Shutter ON
        6         Blower ON
```

```
    7          Heater ON
    8          0 = Units in feet
               1 = Units in meters
    9          0 = Data is height-squared normalized only
               1 = Data is height-squares and extinction
                   normalized
   10          0 = Window conditioner heater released to be
                   turned on if other conditions warrant
               1 = Window conditioner heater is shut off
```

GAIN [N]

The gain used in the ceilometer system. The value may be 0 or 2.
Missing/unknown is recorded as 9.

```
        0 - The gain used is 250
        2 - The gain used is 930
```

PULSE FREQ [N]

The laser pulse frequency. The values range from 0 to 7 (620Hz
to 1120Hz). The control circuitry attempts to keep average laser
power constant. Consequently, a high frequency indicates a low
signal pulse energy. Missing/unknown is recorded as 9.

```
        0 -   620Hz
        1 -   660Hz
        2 -   710Hz
        3 -   770Hz
        4 -   830Hz
        5 -   910Hz
        6 -  1000Hz
        7 -  1120Hz
```

RMS NOISE [N]

Noise Root Mean Square (RMS) voltage in units of Analog-digital
Conversion (ADC) increments, computed from the 100 highest bins
of the latest 12-second measurement period. Values range from
+0.00 to +9.99. The decimal point is omitted from the data.
Missing/unknown is recorded as -999.

SUM [N]

The sum total of backscattered power per unit solid angle (i.e.
range and instrument normalization is applied). The range of
values is +000 to +999. Missing/unknown is recorded as -999.

IIN INFO [N]

Information related to the internal processing algorithms.
Values range from +000 to +999. Missing/unknown is recorded as
-999.

LAS [N]

Measured laser power in units of ADC increments. Values range
from 000-200. Missing/unknown is recorded as 999.

INTL TEMP [N]

Internal temperature governing the receiver sensitivity in tenths
of degrees Celsius. The values range from -09.9 to +99.9. The
decimal point is omitted from the field. Missing/unknown is
recorded as -999.

OFFSET [N]

Offset of the zero signal relative to the data table minimum in
units of Analog-digital Conversion (ADC) increments. Values
range from 00.00 to 99.98. The decimal point is omitted from the
field. Missing/unknown is recorded as 9999.

XX INFO [N]

Information related to internal processing algorithms. Values
range from +00 to +99. The first digit indicates the number of
scans used to determine the cloud information. Missing/unknown
is recorded as -99.

EXTCT COEFF [A]

A number representing the calculated extinction coefficient
values of the ten lowest range gates (0 - 500 feet). The number
determines if an obscuration is ground based or not. Missing /
unknown is recorded as -99. **Note: Special characters "* " and
"# " may also appear in this element -- meaning is not clear as
of this writing (10/18/94).**

7. Description: Start Date

The first ASOS ceilometer data received were for October 1992
from Tulsa, OK and for November 1992 from Lincoln, NE. By June
1994, 7 of the 25 reference stations were providing ceilometer
data.

8. Description: Stop Date

Present

9. Description: Parameter

Atmospheric Composition>Clouds

10. Description: Discipline

Earth Science>Atmosphere>Meteorology
Earth Science>Atmosphere>Climatology

11. Description: Coverage

Southernmost Latitude   25N
Northernmost Latitude   48N
Westernmost Longitude   124W
Easternmost Longitude   70W

12. Description: Location

Areal Coverage

North America>USA

13. Description: Keyword

ASOS
Ceilometer
Ceiling
Clouds
Layers
Thickness
Obstruction

14. Description: Storage Medium

Data are stored on magnetic tape cartridges. Data can be
acquired at 800, 1600, and 6250 bpi density.

15. Description: File Mode

ASCII
EBCDIC (at additional cost)

16. Description: How to Acquire the Data

These data are available for purchase from the National Climatic Data Center, Climate Services Branch, Federal Building, 151 Patton Avenue, Asheville, NC 28801-2733, phone number 828 271-0682.

17. Description: Historical and Current Data Sources

The ASOS 30-Second Ceilometer data archive is a new data source. Data are available beginning in late 1992 for up to 25 ASOS Reference sites.

18. Description: Data Derivation, Algorithms

No information available at this time.

19. Description: Data Derivation, Algorithms Responsibility

No information available at this time.

20. Description: Project

National Weather Service (NWS) ASOS Program.

21. Data Center: Data Center Archiving

National Climatic Data Center, NOAA/NESDIS/NCDC
Federal Building
151 Patton Avenue
Asheville, NC   28801-2733

22. Data Center: Data Center Originating

National Climatic Data Center, NOAA/NESDIS/NCDC
Federal Building
151 Patton Avenue
Asheville, NC   28801-2733

23. Personnel: Archiver

Data Base Management Branch
National Climatic Data Center, NOAA/NESDIS/NCDC
Federal Building
151 Patton Avenue
Asheville, NC   28801-2733
Phone: (828) 271-0445

24. Personnel: Technical Contact

Climate Services Branch
National Climatic Data Center, NOAA/NESDIS/NCDC
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151 Patton Avenue
Asheville, NC   28801-2733
Phone: (828) 271-0272

25. Personnel: Investigator

Data Base Management Branch
National Climatic Data Center, NOAA/NESDIS/NCDC
Federal Building
151 Patton Avenue
Asheville, NC   28801-2733
Phone: (828) 271-0851

26. Sensor: Sensor Name and Operating Principle

See the ASOS USER'S GUIDE

27. Sensor: Sensor Siting

Sensor siting is determined and approved by NWS.

28. Sensor: Sensor Accuracy and Calibration

See the ASOS USER'S GUIDE

29. Sensor: Sensor Sampling Characteristics

See the ASOS USER'S GUIDE

30. Sensor: Data Capture Method at/near Sensor

See the ASOS USER'S GUIDE

31. Station: Station Location Accuracy

Station History Locations are known to the nearest minute of
latitude and longitude.

32. Station: Station Observation Schedule

The 30-second ceilometer data are automatically collected and
stored on station for 12 hours. At this writing the NCDC
downloads the data files via modem for up to 25 ASOS reference

sites.

33. Station: Station Data Time Averaging

See the ASOS USER'S GUIDE

34. Station: Spatial Sampling Using Station Grouping

Not Applicable

35. Stations: Network Participation

The network consists of 25 NWS ASOS reference stations within the contiguous U.S. The reference sites are:

STATION	CALL	STATION	CALL
Astoria, OR	AST	Mobile, AL	MOB
Atlanta, GA	ATL	Paducah, KY	PAH
Atlantic City, NJ	ACY	Pittsburgh, PA	PIT
Brownsville, TX	BRO	Portland, ME	PWM
Bismarck, ND	BIS	Raleigh-Durham, NC	RDU
Charleston, SC	CHS	Salt Lake City, UT	SLC
Dallas-Ft. Worth, TX	DFW	San Francisco, CA	SFO
Denver, CO	DEN	Sault Ste. Marie, MI	CUI
Grand Rapids, MI	GRR	Syracuse, NY	SYR
Great Falls, MT	GTF	Tucson, AZ	TUS
Lincoln, NE	LNK	Tulsa, OK	TUL
Los Angeles, CA	LAX	West Palm Beach, FL	PBI
Minneapolis-St. Paul, MN	MSP		

36. Stations: Geographic Criteria for Selecting Stations

The criterion for site selection was wide areal coverage of climatic regimes within the contiguous U.S.

37. Stations: Geographical Distribution

Stations are located in the contiguous United States.

38. Stations: Elevation Distribution

Elevations are generally below 1000 meters above sea level. The minimum elevation is near sea level and the maximum elevation is about 1600 meters.

39. Data Quality: Instrument Problems

No information available at this time.

40. Data Quality: Missing Data Periods

There are no general periods of missing data for this relatively
new data set. Data may be missing at random times due to
instrument failures or communications problems in downloading
data from specific sites.

41. Data Quality: Sampling Biases

No information at this time.

42. Data Quality: Error Detection and Correction

See ASOS USER'S GUIDE. Only preliminary error checks are
accomplished at the observation site. When downloaded to NCDC,
the data are processed through computer software to add header
information to each record. No attempt is made to correct the
data or transmission errors.

43. Data Quality: Missing Value Estimates

Replacement values for missing data are not estimated.

44. Data Quality: Quality Control Responsibility

Responsibility for data quality control rests with NWS
electronics technicians and station managers.

45. Data Quality: Known Uncorrected Problems

See ASOS USER'S GUIDE.

46. Data Quality: Confidence Factors

As stated in the ASOS USER'S GUIDE, March 1998, "These data have
not undergone final quality control checks. They are primarily
intended for maintenance troubleshooting purposes and should not
be used as valid meteorological data without extensive
evaluation.

47. Data Quality: History of Data Usage

This is a new data set. The data are expected to support the same
types of uses for previous surface observations of cloud data.

48. Data Quality: Quality Statement

See the <u>ASOS USER'S GUIDE</u>.

49. Dates: Revision

August 25, 1994
May   11, 1994
October 18, 1994
September 29, 1997
August 15, 1998

50. Dates: Science Review Date

Not applicable at this time.

51. Dates: Future Review Date

Not applicable at this time.

52. Other Data Sets: Input Sources to this Data Set

Not applicable.

53. Other Data Sets: Essential Companion Data Set

None.

54. Other Data Sets: Derived from this Data Set

ASOS 1-minute data processed into TD3285.
ASOS 5-minute data processed into TD6401.
Daily Summary Data, processed into TD3210 and published in the
       Local Climatological Data (LCD) publication.
Monthly Summary Data
Hourly Observations (SAO) transmitted via AFOS (in the future
       AWIPS) and processed into TD3280, published in the LCD.

55. Other Data Sets: Larger Collections

No information available at this time.

56. Other Data Sets: Similar Data Sets

See Topic # 54.

57. References

National Weather Service, August 1991: <u>ASOS USER'S GUIDE</u>, NOAA-NWS, Silver Spring, MD.

58. Summary

A major part of the NWS modernization effort in the 1990's is the implementation of the Automated Surface Observations System (ASOS). The ASOS Cloud Height Indicator (CHI) is a laser ceilometer that features a rapid pulse and sampling rate. The pulse rate varies from 620 Hz to 1,120 Hz according to ambient air temperature. At a nominal pulse rate of 770 Hz, the ceilometer outputs 9,240 pulses during a 12-second sampling period. The vertical resolution is 50 feet up to 12,600 ft. above ground level (AGL). The maximum reporting height is 12,000 ft. The ceilometer data are sampled by the ASOS software once each 30 seconds. The accumulated 30-second data are arranged by height and averaged over a time-weighted 30-minute period to determine up to three cloud layers for each observation.

This 30-second Ceilometer data set contains the 30-second samples and sensor status information for twenty-five ASOS reference sites (See Topic 35). Because of data volume and time requirements for downloading the ceilometer data, these high-resolution data are not downloaded or archived for other ASOS sites.